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Capacity Markets Represent a Bad Bargain for Texas Consumers

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Findings

- Customers in capacity markets do not get more capacity or reliability for their money; for the most part they just pay more for the same services they already receive.
- Capacity markets are just as vulnerable to disruptions of reliability as Texas' energy-only market, if not more so.
- Capacity markets offer no more accurate forecasts of needs than Texas' energy-only market.

This is the sixth in a series of papers examining the debate over the reliability of the Texas electricity market.

Introduction

Last week, the Public Utility Commission of Texas (PUC) sponsored a workshop on resource adequacy, the question of day being whether or not to impose an East Coast style capacity market onto Texas' regional transmission organization, ERCOT. While the PUC heard many opinions, a large portion of those in attendance expressed concern that ERCOT could not meet its future energy needs unless it undergoes some form of massive government intervention. On that point, the Foundation has published several papers refuting the claim that the energy-only market faces a shortfall in the years ahead. But, what about the claim that the capacity market can improve ERCOT's reliability?

The chief rationale used to justify centralized capacity markets is their alleged ability to boost a regional transmission organization's (RTO) energy capacity and, accordingly, its reliability. Past experience, however, suggests that the only sure prediction in a capacity market is that energy bills will go up. Capacity markets neither boost generating capacity nor provide for a more reliable grid. Their clumsy jumble of fees, subsidies, and penalties cannot accurately recreate the incentives found naturally in an energy-only market. The result is a regulatory scheme that sends billions of dollars in capacity payments to existing generation owners and base load energy plants that do little to provide sufficient incentives to spur future investments. If imposed on Texas' energy industry, the capacity market's only success will lie in its ability to subsidize a generation company's bottom line.

This paper seeks to examine the alleged benefits of a centralized capacity market and ascertain whether those benefits are likely to come to pass if regulators impose a capacity market onto Texas' electricity market. The paper is divided into three sections, each tackling one of the most commonly invoked justifications for a Texas capacity market. The first section investigates whether capacity markets have a proven track record of boosting a RTO's installed capacity and, thereby, its reliability. Section two questions whether a capacity market can bolster ERCOT's reliability enough to warrant the capacity market's $4.7 billion price tag—this, even assuming that the capacity market works as promised. The final section explores whether a capacity market can offer ERCOT more accurate forecasts of its long-term energy needs than the energy-only market. With past experience and the capacity market's own artificial incentives as touchstones, the paper concludes that the capacity market cannot overcome the inefficiencies inherent to a pseudo market. When compared to the success and productivity of the energy-only market, the capacity market proves to be a bad bargain for Texas ratepayers.

A Texas Capacity Market Will Not Boost Capacity

There is no evidence that a centralized capacity market boosts an RTO's energy capacity, and there is certainly no evidence that proves that it does so more efficiently than an energy-only market. In fact, the numbers from PJM—the RTO that serves all or parts of 13 states in the mid-Atlantic—infer just the opposite. A 2012 Issue Brief supplied by the American Public Power Association (APPA) uncovered that from the inception of PJM's capacity market in 2007 through its 2011 auction (covering the commitment periods of 2010-2014), capacity payments funded only about 7,000 MW of new generation, about 4 percent of PJM's total installed generat-

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ing capacity (180,000 MW). (APPA 2012) This is despite customers paying $50 billion in capacity payments during that time. Put in context, the same amount of funds could have purchased 129 combined-cycle gas-fired generators, each with 400 MW of capacity, had that money been spent directly on new generation. (APPA 2012) That's 51,600 MW of possible new generating capacity versus the 7,000 MW created by the capacity market—not a very efficient system.

This lack of efficiency is particularly apparent when held up against Texas' energy-only market. During those same commitment periods, the energy-only market produced more investments than PJM's capacity market, all without inflicting a $4.7 billion annual tax on Texas consumers—the cost of the new investment was borne by investors. The energy-only market supplied ERCOT with over 10,000 MW of new generating capacity, not including upgrades or expansions to existing plants. (PUC 2013) Since ERCOT is less than half the size of PJM (84,000 MW), the new generation constituted about 12 percent of ERCOT's total installed generating capacity. (ERCOT 2012) This means that not only did Texas' energy-only market yield more capacity in terms of sheer megawatts, but that the added generation represented a greater portion of the grid's installed capacity. PJM's simulated price-signals just could not reinvent the investment incentives that Texas' energy-only market created naturally, notwithstanding its high costs.

Moreover, higher capacity rates do not seem to incentivize investment in new generation. Higher priced zones in PJM have not attracted or retained a greater portion of electricity capacity than the rest of the RTO. (APPA 2012) Both Maryland and New Jersey have even experienced forecasts of material capacity shortages despite persistently paying higher capacity prices than other areas. Frustrated by the capacity market's failure, both states were ultimately forced to solicit their own contracts with energy generators in order to avoid reliability risks. (Clamp 2011) Of course, installed capacity is no guarantee for reliability—Texas' last rolling blackouts occurred with a reserve margin above 15 percent—but the stated purpose of a capacity market is to eliminate at least one reason, the lack of capacity, for the grid to fail. In the cases of both Maryland and New Jersey, the capacity market did not accomplish even that.

The reason for this is simple: most of the funds never went to finance *new* generation but instead found their way into subsidizing the operational costs of existing resources. According to an APPA 2010 paper, more than 93 percent of the money paid by PJM customers went to existing generation. Only 1.8 percent found its way to new or "reactivated" generation sources. (APPA 2010) In addition, that money was not confined to peak generating plants—the narrow segment of the market where regulators fear that energy investment is weak. Capacity markets do not distinguish between resource types; they instead pay all resources on a per megawatt basis without considering the plant's efficiency or ability to make a profit. As a result, base load generation plants captured the bulk of PJM's capacity payments despite the fact that those plants can recoup their fixed costs from energy sales alone and that there was no shortage of investments in base load generation. (Hausman and Wittenstein 2011) PJM customers, therefore, did not get more capacity or reliability for their money; for the most part they just paid more for the same services they already received, in effect, paying twice. Capacity markets have not fulfilled their public purpose of increasing capacity in PJM. There is no reason to believe capacity markets will operate any differently in Texas.

A Texas Capacity Market Will Not Increase Reliability

Instituting a capacity market will not offer Texas ratepayers greater reliability; a capacity market may even detract from it. Proponents of a capacity market make the mistake of treating capacity and reliability as interchangeable goods, when they are in fact two separate, albeit related, characteristics of an RTO's electricity generation. Capacity refers to the amount of megawatts (or power) that generating plants within an RTO could theoretically produce if their operations were running at top efficiency, whereas reliability refers to the RTO's ability to deliver that power to consumers without interruption.

Thus, although capacity plays an important role in averting disruptions since grid operators need access to a sufficient supply of energy to keep up with demand, capacity is but one wall of the structure that builds up an RTO's dependability. Operational delays, delivery risks, geographical limitations, transmission availability, startup costs, routine maintenance, all contribute to the grid operator's ability to convert capacity into usable energy. (Kleit and Michaels 2013a) A disruption in any one of these factors could prevent the RTO from delivering electricity to a ratepayer's home or business even though the official amount of capacity the RTO has on hand surpasses the suggested reserve margin. Access to capacity is necessary for effective operations, but it is certainly not sufficient.

For this reason, even if a Texas capacity market meets all of its expectations—unlikely considering its dismal performance in the East Coast energy markets—it cannot foreclose the possibility of episodic blackouts since capacity, by itself, is no guarantee for reliability. Texas' own experience bears this out. In the winter of 2011, Texas suffered a series of rolling blackouts after unusually frigid weather shut down 8,000 MW of power generators, about 9.5 percent of ERCOT's installed capacity. (Grisales, Plohetski, and Ward 2011) Pointedly, the blackouts did not take place because ERCOT lacked sufficient investments in energy capacity; Texas had a reserve margin above 15 percent at the time, and demand was well below summer peaks. Rather, the blackouts occurred because an unfortunate alignment of abnormally cold weather, inadequate winterization, scheduled maintenance, and curtailments in natural gas made that capacity inaccessible. (Galbraith 2011) Investments in capacity only work so long as other links in the supply chain remain firmly connected. In the case of the 2011 blackouts, that chain was firmly broken, making it impossible for the grid operator to convert the capacity on the books into usable electricity. It was a "one-day-in-ten-years" event that no energy market could have fully prevented.

Capacity markets are just as vulnerable to these types of disruptions as Texas' energy-only market, if not more so. At the outset, they suffer from the same limitations as the energy-only market, in that the law of diminishing returns places an upper limit on how much impact additional capacity will have on an RTO's reliability. (Anderson 2013) At some point, the cost of adding capacity exceeds the value of incremental improvements in reliability, meaning that capacity markets will remain exposed to the same forces that bring about unforeseeable shutdowns. This is why PJM endured blackouts last month, when unseasonably hot fall weather pushed electric consumption to record September highs at the same time that multiple plants and transmission lines went off grid for seasonal maintenance. PJM controlled an adequate supply of capacity, and it faced a consumer demand that was far lower than its yearly high, much less its all-time record (142,431 MW versus 157,509 MW and 163,760 MW, respectively). (Reuters 2013) Nevertheless, unpredictable externalities made that capacity unavailable for use, forcing a shutdown and showcasing that capacity alone is no guarantee for reliability.

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In addition, capacity markets suffer from a severe design flaw that renders their generating capacity more susceptible to interference. Namely, capacity markets hold a too narrow view of what makes the electricity market dependable. Capacity markets have one stated purpose: to increase investments in an RTO's energy capacity by offering generators a stable revenue stream, which in turn would eliminate the chief reasons for the grid to break down. Not even addressing the capacity market's proven failure to boost energy investments, this single-minded objective causes the capacity market's regulatory regime to suffer from tunnel vision. (Hunker 2013) Capacity markets do not consider other operational and availability concerns when securing energy resources. They instead offer generators uniform payments for each megawatt of capacity in order to smooth income streams and ensure that generators recover their fixed costs, irrespective of that generator's location, resource type, startup time, et cetera. Capacity markets interpret reliability as being dependent on the amount of capacity alone.

This limited outlook has the consequence of creating several perverse incentives that not only make the energy market less efficient but that also eats away at an RTO's ability to circumvent unforeseen disruptions in the grid. Capacity markets de-

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couple profits from those attributes that make the market more efficient and reliable. In a real electricity market, outside of an economist's computer model, not all capacity has equal value. Generators with dependable resource types, quick startup times, and a convenient location have greater economic worth than a dirty, 50-year old plant with frequent startup failure that is located far away from any large load pocket. Yet, in a capacity market, each generation facility receives the same per megawatt capacity payment regardless of age, dependability, and/or performance because, in a capacity market, regulators arbitrarily grant sheer operating potential the highest value, not taking into account the ability to deliver that potential to consumers. (Kleit and Michaels 2013a)

As a result, investors have little or no incentives to build plants where and when they are needed most. Instead, the fixed price of capacity payments, and the guaranteed revenue stream, enables energy producers to invest in generation plants in locations where they might not otherwise be profitable, injecting greater uncertainty since converting this capacity to usable energy is contingent on other forces, such as transmission availability. In addition, capacity payments encourage energy producers to maintain obsolete generation units, forestalling their replacement and increasing the age of an RTO's generation fleet. Since older units are more susceptible to outages and increased environmental concerns, capacity markets have the ironic consequence of reducing reliability. When combined with the perverse incentive energy producers have in guarding the status quo, such as preventing the entry of any new generation that would lower their capacity payments, it is hardly any wonder why several states in existing capacity markets are looking at alternative means to boost both their capacity and their reliability for fear of grid failures.

Capacity markets are, at best, subject to the same odds of grid failure as Texas' energy-only market. At worst, the capacity markets' failure to create proper price signals undermines an RTO's reliability through perverse incentives that lead to a suboptimal resource mix.

A Texas Capacity Market Will Not Offer More Accurate Forecasts

The final justification offered in support of capacity markets is that Texas' energy-only market cannot accurately gauge ERCOT's long-term energy needs. As proof, advocates note that the long-term forecasts of ERCOT's energy capacity have fallen below the suggested reserve margin; they also point out that investment in new generation has slowed. Their worries, however, are premature. Past experience suggests that predicted shortfalls are part of an effectively running energy-only market and that centralized capacity markets cannot predict future demand more accurately.

Not even addressing the question of whether ERCOT's reserve margin accurately depicts Texas' long-term capacity needs, forward projections of capacity shortfalls are notoriously unreliable. Time and again, long-term projections show the market falling below the reserve margin, yet as the delivery date approaches, that gap quickly closes until capacity levels are at the margin or close to it. (Kleit and Michaels 2013b) This does not reflect a failing of the market as some regulators would suggest; rather it shows that the energy-only market is functioning as it should. Energy-only markets incite new generation only when it is needed, not three years in advance when it is uneconomic and can only be sustained through administrative subsidies. As PUC Commissioner Ken Anderson observed, "An efficient energy-only market should always show a capacity reserve margin shortfall 4-5 years out." (Anderson 2012)

Advocates of a capacity market provide no evidence that centralized capacity markets possess a clearer or farther gaze when it comes to forward projections. Assuming that the final capacity market resembles the one currently under debate, ERCOT would secure capacity by hosting a forward auction three years in advance of the delivery date. This means that actors within ERCOT could make decisions under the assumption that the market has a sufficient supply of energy capacity for at least

three years, barring of course any unforeseeable disruption in the supply chain.

Importantly, this assurance only covers the next three years and not very well. Regulators must remain cautious because foresight is limited and changes in transmission, load growth, and demand response could upset the accuracy of the reserve margin. The Federal Energy Regulatory Commission (FERC) observed that longer forward periods and longer commitment periods, like the ones proposed for Texas, "can result in increased risk for customers" because "they place greater reliance on the accuracy of long-term forecasts of energy prices, demand, and the economy." (FERC 2013) Since capacity markets force customers to bear the risks of bad investments, a longer forward period that relies heavily on speculation could result in customers paying for unneeded capacity as conditions change. Like all electricity markets, capacity markets face very real limitations when it comes to fortune telling. The difference is that, in a capacity market, the costs for over investments are borne by customers rather than generators and the decision to over invest is made by a handful of regulators rather than of millions of market actors responding in real-time to changes in supply and demand.

If capacity markets can only offer a three-year forward period, why is Texas' energy-only market condemned for not having capacity investments prepared five or ten years in advance? It seems like an unmerited double standard to demand that the energy-only market meet reserve margins years out, when the government's own "expert-run" regulatory scheme cannot reliably assess capacity needs three years hence. The very same reasons that regulators do not want to experiment with far looking capacity markets is why the energy-only market appears to have long-term capacity shortfalls. Premature investments lead to uneconomic results. Once again, the capacity market offers Texas consumers nothing that they could not receive from the energy-only market at a cheaper price.

Conclusion

Past experience shows that a capacity market will not boost energy capacity, increase reliability, or offer more accurate forecasts if imposed on Texas' energy industry. Capacity markets contain certain fundamental flaws inherent to its artificial incentives and pseudo market that make it inefficient, self-defeating, and altogether unable to compete with the energy-only market in terms of investments, reliability, and price. Namely, capacity markets do not, and cannot, distinguish between resource types, meaning that all generation plants receive the same per megawatt capacity payment, regardless of age, dependability, performance, and/ or profitability. The result is a system that has funneled billions of ratepayer dollars into existing generation and base load energy plants as well as encourage uneconomic investments in aging generators, undependable resources, and plants located far away from busy load pockets, all of which erodes the grid operators ability to deliver available capacity reliably to customers.

Capacity markets contain certain fundamental flaws inherent to its artificial incentives and pseudo market that make it inefficient, self-defeating, and altogether unable to compete with the energy-only market in terms of investments, reliability, and price.

It's hard to imagine that a Texas capacity market would somehow evade all these expenses, mishaps, and broken promises. More likely, installing a capacity market in Texas would deliver more of the same failure. Capacity markets do not engender the level of success that warrants a multi-billion dollar tax on Texas consumers, and the narrow complaints about peak generation in Texas' energy-will not be alleviated by a capacity market. Rather than Texas policymakers saddling consumers with the expense and overhaul of one of the most efficient electricity markets in the world, they should look for ways to increase efficiency by reducing intervention in the market. The pocketbooks of consumers will thank them. ★

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